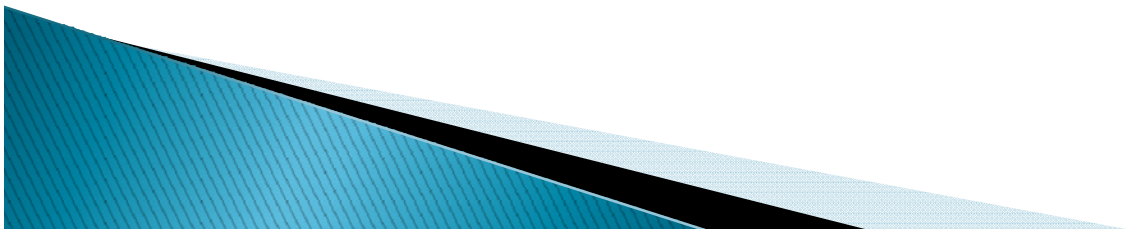


# **Ludington Properties Long Term Management Plan**

Ludington, Michigan

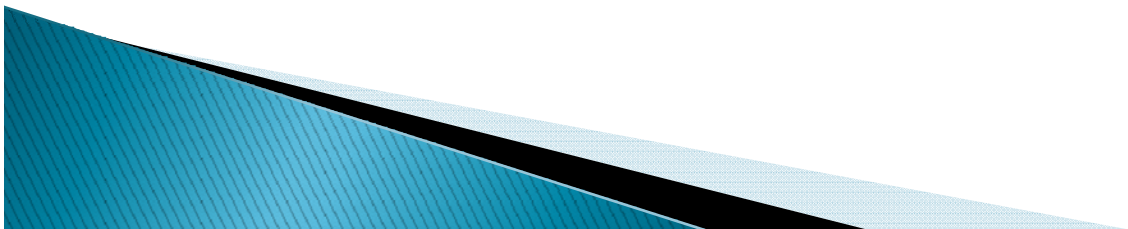
March 2014





# Meeting Objectives

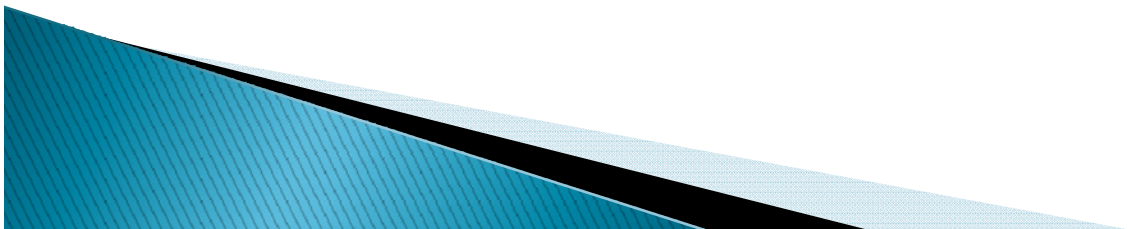
- ▶ Provide an update on:
  - Dow's long term management plan and phased approach for covering inactive portions of South Pond
  - Conservation focused land use project currently under discussion with Pere Marquette Township, the Land Conservancy of West Michigan, The Nature Conservancy, and Occidental Chemical
- ▶ Inform MDEQ of environmental evaluation of lands that may be transferred into public ownership as part of the conservation focused land use project





# Agenda

- ▶ Short review of Ludington site background and history
- ▶ Update on conservation-focused land use project
- ▶ Update on West Cell cover construction project
- ▶ Review of East and Secondary Cell construction planned for 2014
- ▶ Environmental conditions of Dow properties





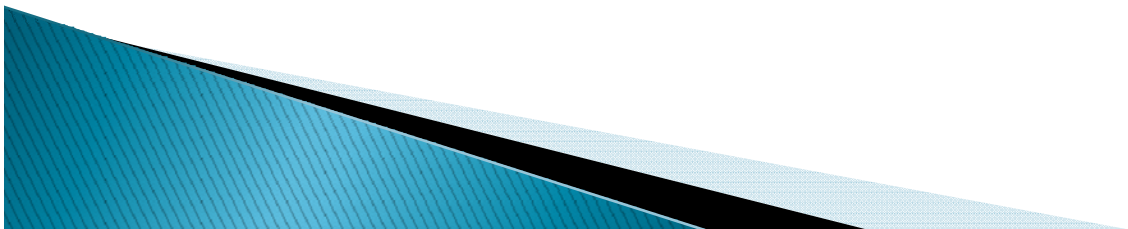
# Ludington Site Background





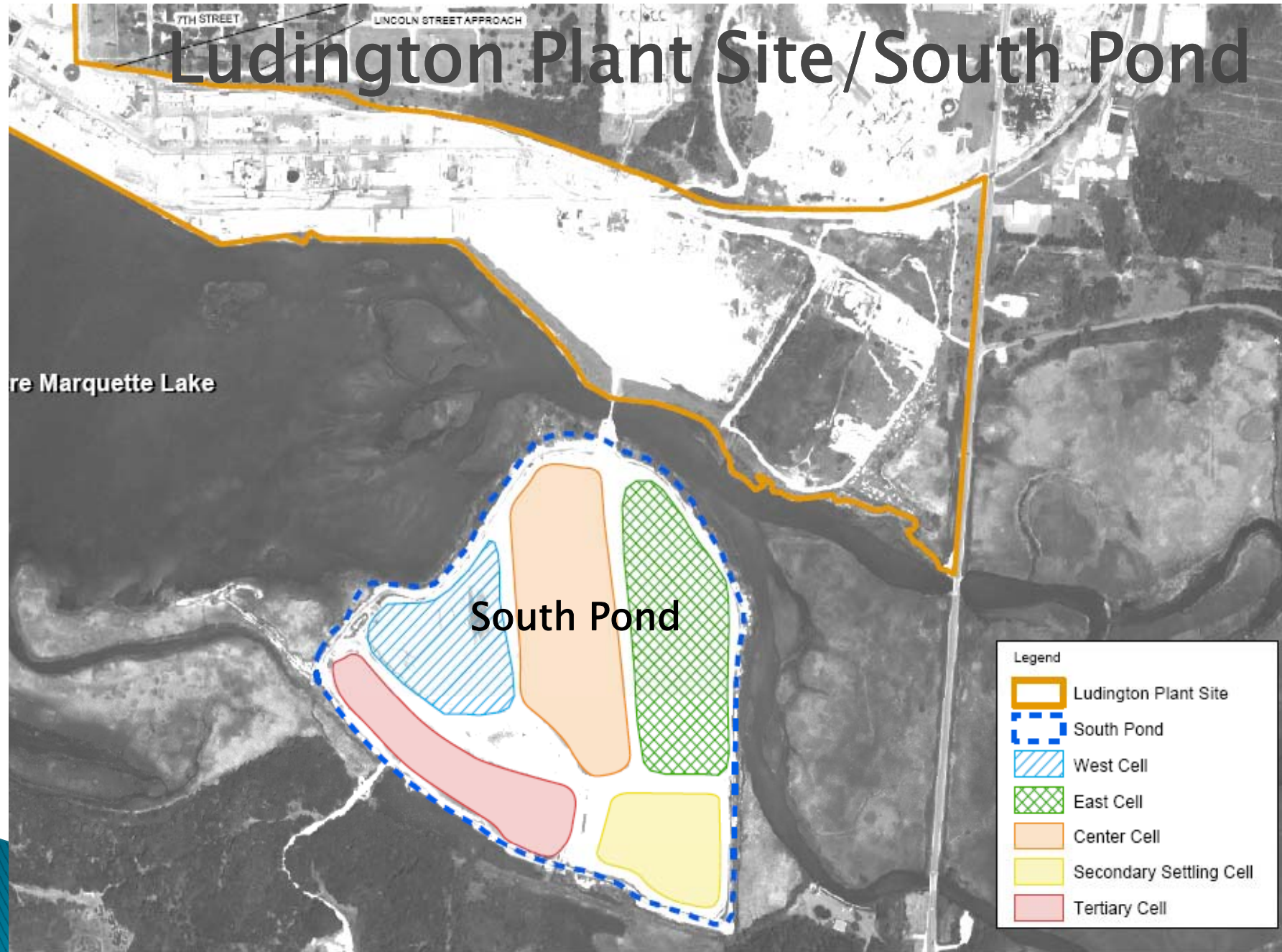
# Plant Site History

- ▶ Dating back to 1880s, the site was occupied by the Lyons Salt Works, the Anchor Salt Company, and the Morton Salt Company
- ▶ In the early 1940s, the site was operated for the US Defense Department by the Dow Magnesium Corporation to make magnesium hydroxide
- ▶ Dow purchased in 1948 and operated through July 2009, at which time the site was sold to OxyChem, the current owner
- ▶ The site is located on 183 acres within an industrialized area of Ludington, Michigan
- ▶ The plant remains in operation, manufacturing various grades of calcium chloride salt and calcium chloride solution





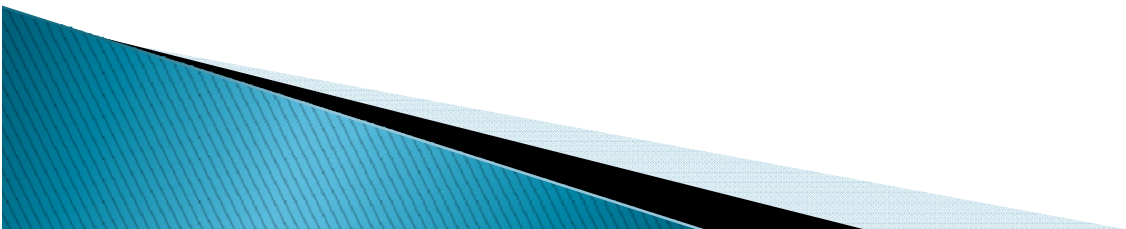
# Ludington Plant Site/South Pond





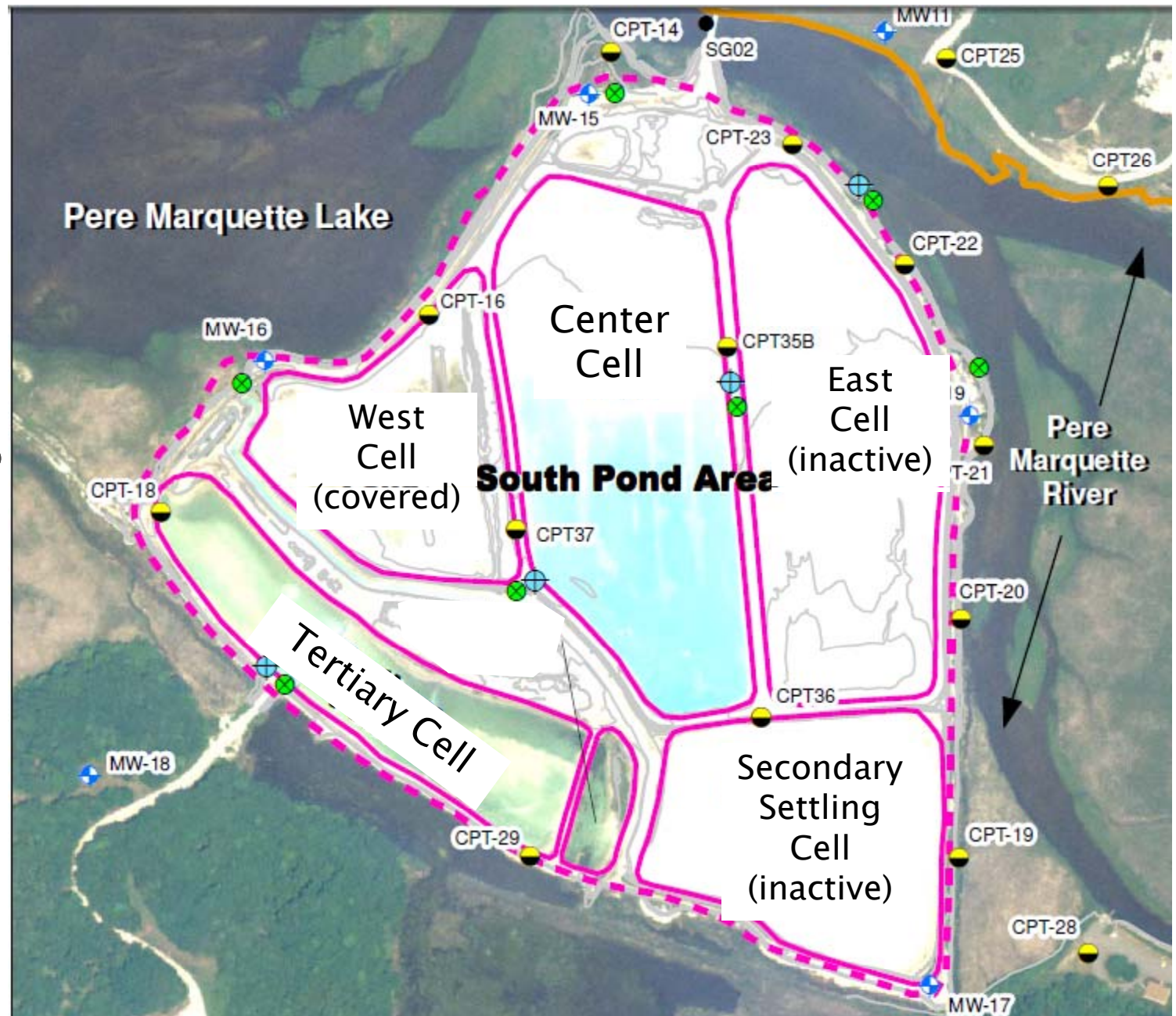
# South Pond Overview

- ▶ South Pond operations began in the 1960's.
- ▶ The South Pond is currently comprised of a series of retention cells that hold post-process water for treatment before it is discharged directly to Pere Marquette Lake under a NPDES permit.
- ▶ Currently South Pond serves 3 primary functions:
  - Heat loss
  - Ammonia volatilization and reduction
  - Settling of solids





# South Pond Features





# South Pond Overview

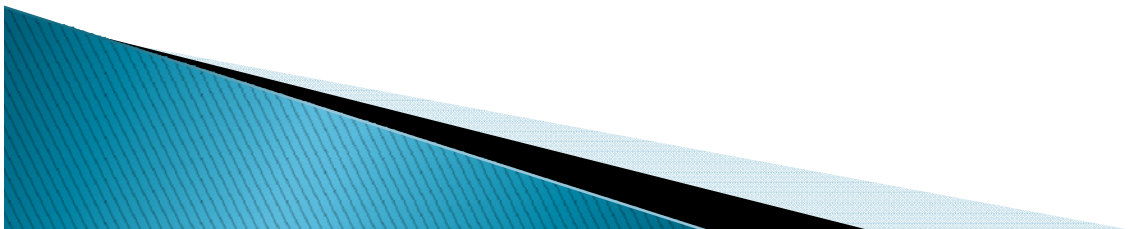


1. Process water enters center cell for primary settling
2. Travels through open channel to final settling cell
3. Travels through final settling pond
4. Travels through gate to polishing pond
5. Leaves polishing pond and is pumped to outfall 001



# South Pond Operational Status

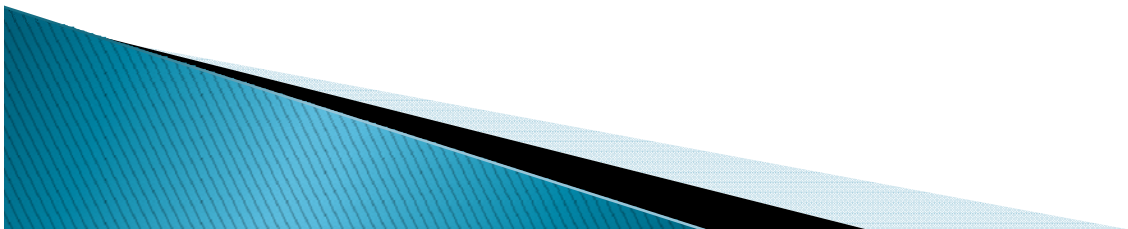
- ▶ Function of South Pond has changed over time – under previous operations, the pond system accumulated substantial solids that were periodically “mined” from the cells and sold for agricultural uses
- ▶ Solids are no longer mined from South Pond
- ▶ West Cell is full of solids. In 2013 cell was covered and revegetated with wetland and upland features.
- ▶ East Cell is full of solids and is no longer in service. Project planned for 2014 to cover and revegetate.
- ▶ Secondary Cell is no longer in service. Project planned for 2014 to cover and revegetate.





# Long Term Management Plan

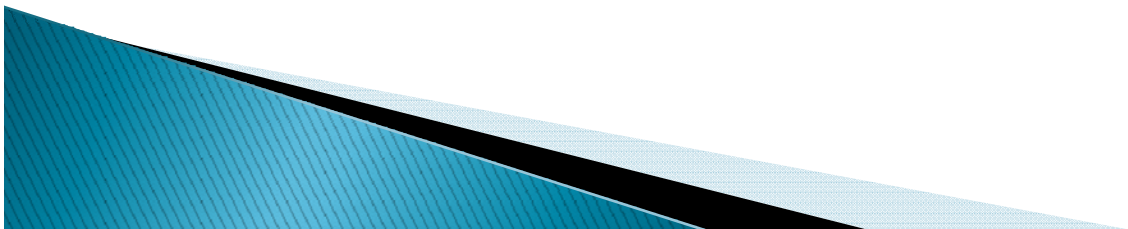
- ▶ Dow has developed a long term management plan for the South Pond that consists of the following elements:
  - Cover exposed solids to reduce exposures to the environment in cells that are no longer in service
  - Cover subsequent cells in a phased manner if and when they are no longer needed by OxyChem for post-process water treatment
  - Integrate closure of South Pond complex, should termination of waste water operations occur, into a broader conservation-focused land revitalization effort
  - Consider transferring ownership of rehabilitated cells to public as part of conservation focused land revitalization effort





# Timeline for South Pond Work

- ▶ 2014
  - Complete final design of cover for East and Secondary Cells
  - Complete plantings on West Cell
  - Construct cover for East Cell, Secondary Cell, perimeter dikes and unused areas on north side of South Pond complex
- ▶ 2015
  - Complete plantings on East and Secondary Cells
- ▶ 2015 and Beyond
  - Possible trail construction around perimeter of ponds to connect conservation lands south of Pere Marquette Lake with those north of Pere Marquette River and Ludington
  - Cover Center and Tertiary Cells when OxyChem terminates operations





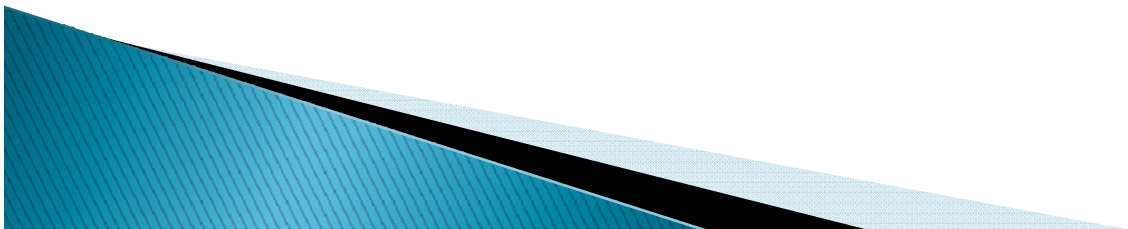
# Conservation Focused Land Revitalization





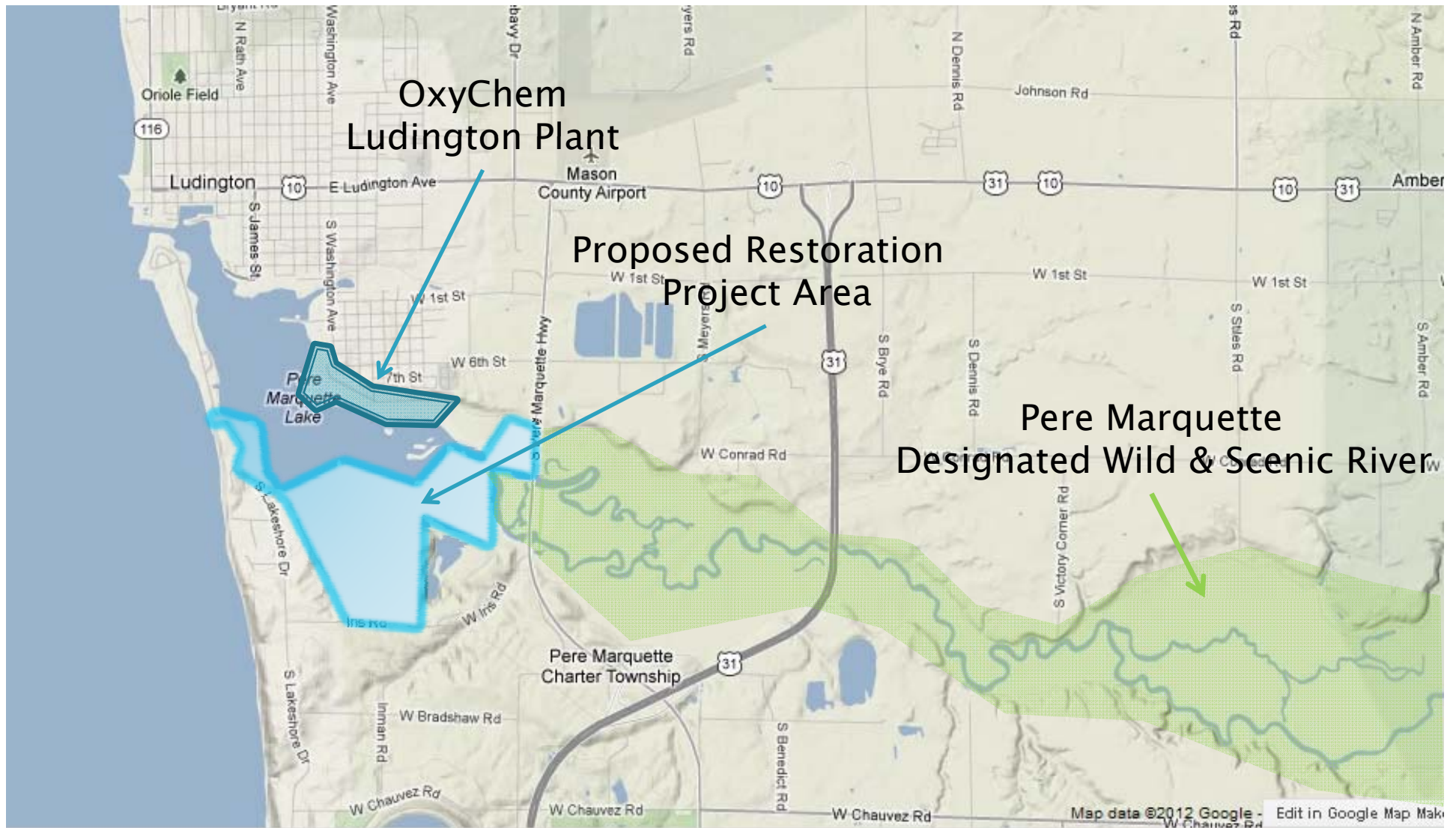
# Conceptual Vision for Conservation-Focused Land Revitalization

- ▶ Dow has developed a concept for conservation-focused land uses for former industrial and undeveloped lands along Pere Marquette Lake
- ▶ This vision anticipates the eventual restoration of the South Pond complex and incorporation into a conservation-focused land use area





# Location of Proposed Project Area





# South Pond Aerial View – Before





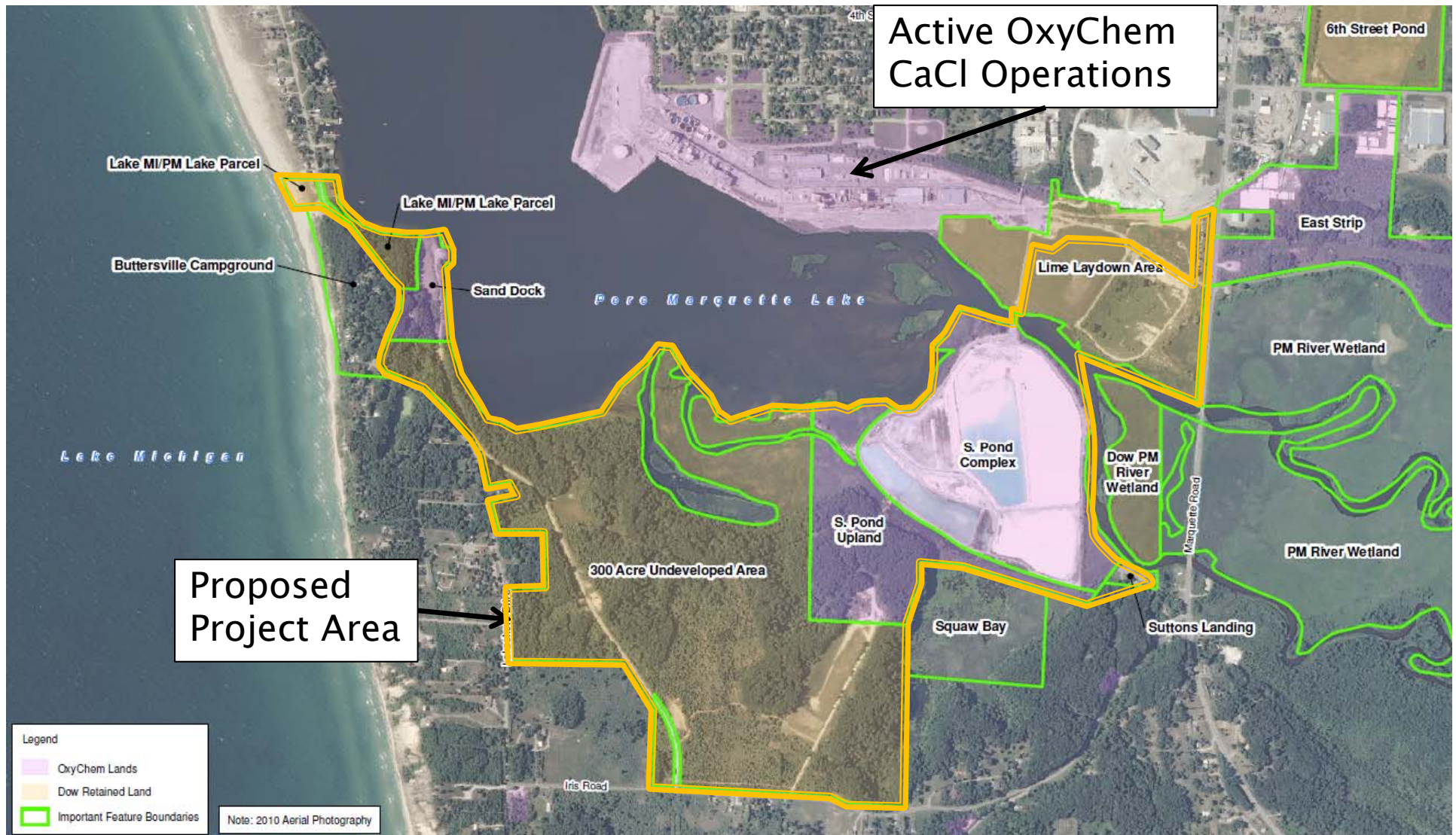
# South Pond Aerial View – Conceptual Rendering





# Project Area

(current boundary, subject to revision)





# Conservation Focus

- ▶ General Concept – Land use focused on restoration and enhancement of habitat for Threatened and Endangered species. Create “destination” area for wildlife watching and low impact outdoor recreation. Develop multi-use trail system connecting Buttersville Peninsula to Ludington
- ▶ Primary Stakeholders –Pere Marquette Charter Township (PMCT) & Land Conservancy of West Michigan
- ▶ Other Key Stakeholders – The Nature Conservancy (TNC), Audubon Society (MI and National), Ducks Unlimited (DU) and others
- ▶ Long-Term Ownership – PMCT owns with conservation easement and stewardship support from stakeholders.





# Conservation Focus – Key Features

- ▶ Conservation focused land use emphasizing habitat restoration and improvement
- ▶ Ludington–Buttersville Peninsula connector trail primarily along old railroad grade for hiking and bicycling
- ▶ Low-impact interior trail system for wildlife observation, hiking and snowshoeing
- ▶ Boat launch and fishing access on PM River





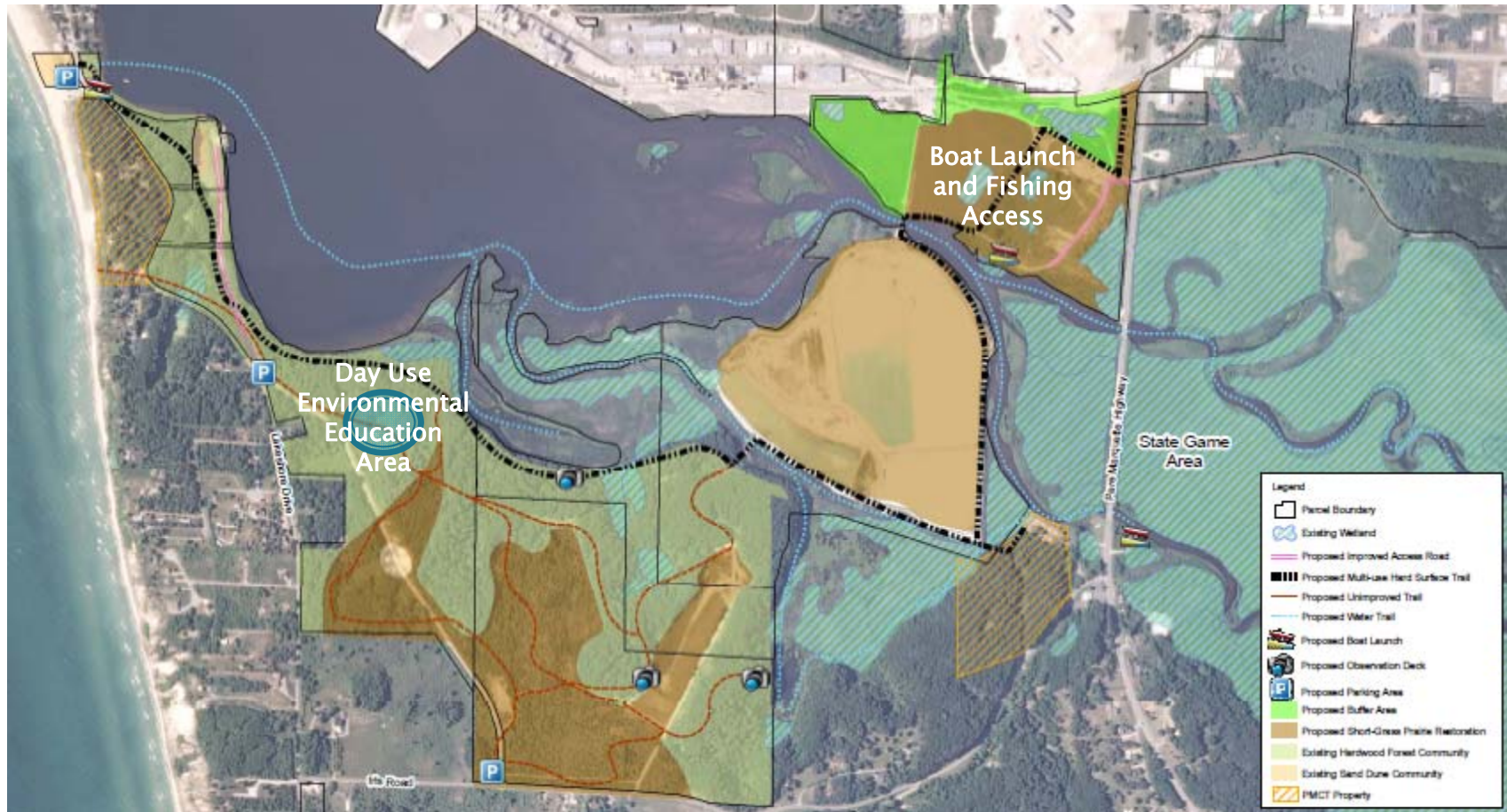
# Conservation Focus – Key Features

- ▶ Water trail connecting Pere Marquette Wild and Scenic River with Buttersville Peninsula and Lake Michigan
- ▶ Refurbish AC Park for environmental education, picnicking and limited day use. Parking for trail head at Lakeshore Drive and Iris Road
- ▶ Improved access to PM Lake for ice fishing, hiking, and kayaking





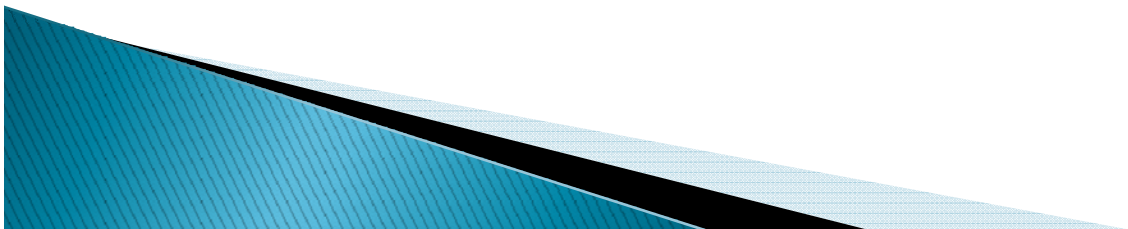
# Conservation Focus Key Features





# Approach/Milestones

- ▶ Recreation Plan Preparation – PMCT
- ▶ Property Transfer between Dow and Oxy
- ▶ Summit Meeting with Key Stakeholders, April 2014
- ▶ MNRTF Grant Preparation, Q3–Q4 2014
- ▶ Environmental Site Assessment Plan, Summer 2014
- ▶ MDEQ Endorsement of ESA Plan, Q4 2014
- ▶ MNRTF Grant Application due April 1, 2015
- ▶ Due Care Plan due October 1, 2015





# Project Status

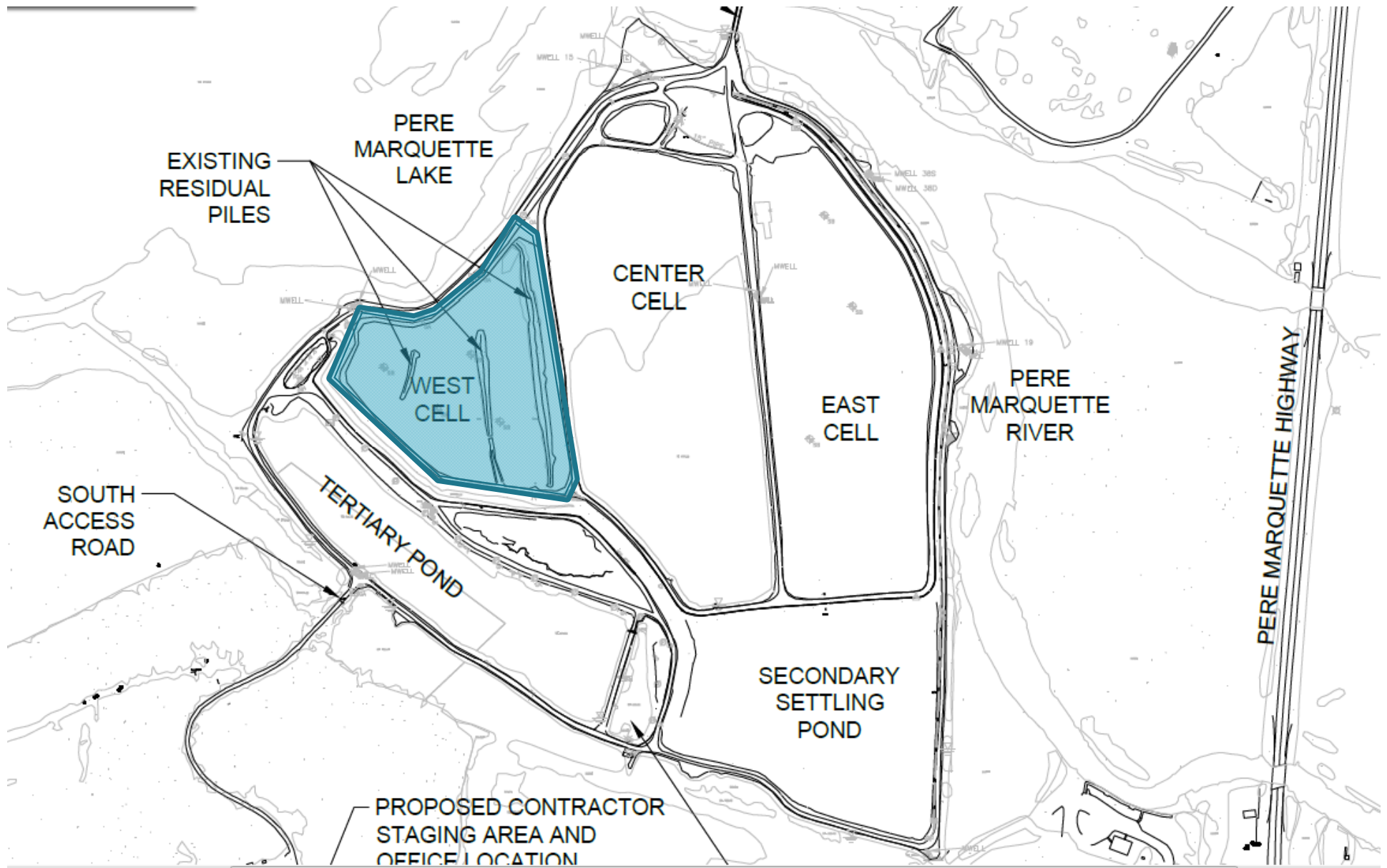
- ▶ Pere Marquette Charter Township
  - Township supportive as the MNRTF Grant applicant
  - Requested support from Land Conservancy of West Michigan (LCWM) and The Nature Conservancy (TNC)
  - In process of incorporating conservation opportunity of Dow lands into updated Recreation Plan
- ▶ Michigan Natural Resources Trust Fund
  - PMCT targeting grant proposal submission in April 2015
  - Other grants and funding sources will likely be pursued
- ▶ Ongoing Environmental Site Assessments



# West Cell Project Update





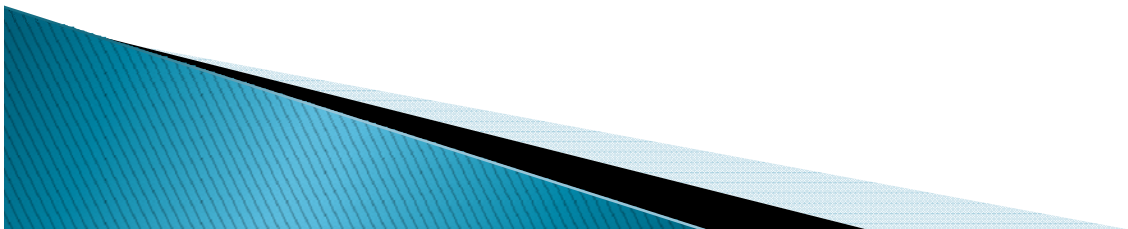


## West Cell Project Area



# Summary of West Cell Work

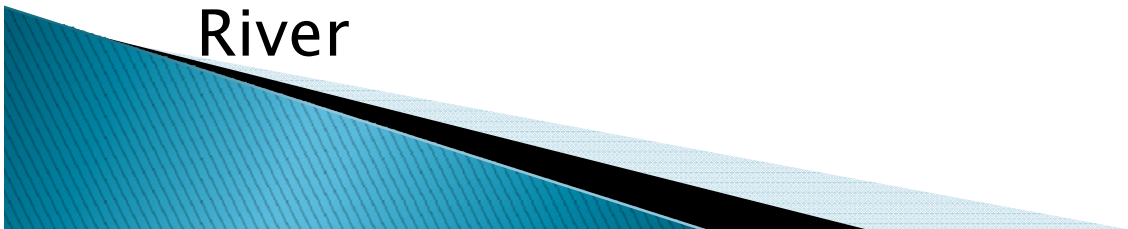
- ▶ Completed installation of cover over West Cell in 2013.
- ▶ Placed vegetative cover over approximately 10 total acres
- ▶ Initial cover vegetation was established prior to winter
- ▶ Additional plantings to occur in spring 2014.





# Benefits of Vegetative Cover

- ▶ Eliminates direct exposure to residual solids
- ▶ Reduces infiltration from precipitation
- ▶ Improves aesthetics of cells
- ▶ Increases biodiversity and habitat and enhances ecological services compared to standard cover designs
- ▶ Less long-term maintenance requirements
- ▶ Provides opportunity to incorporate South Pond into a large, contiguous conservation-focused corridor linking Lake Michigan to Pere Marquette River



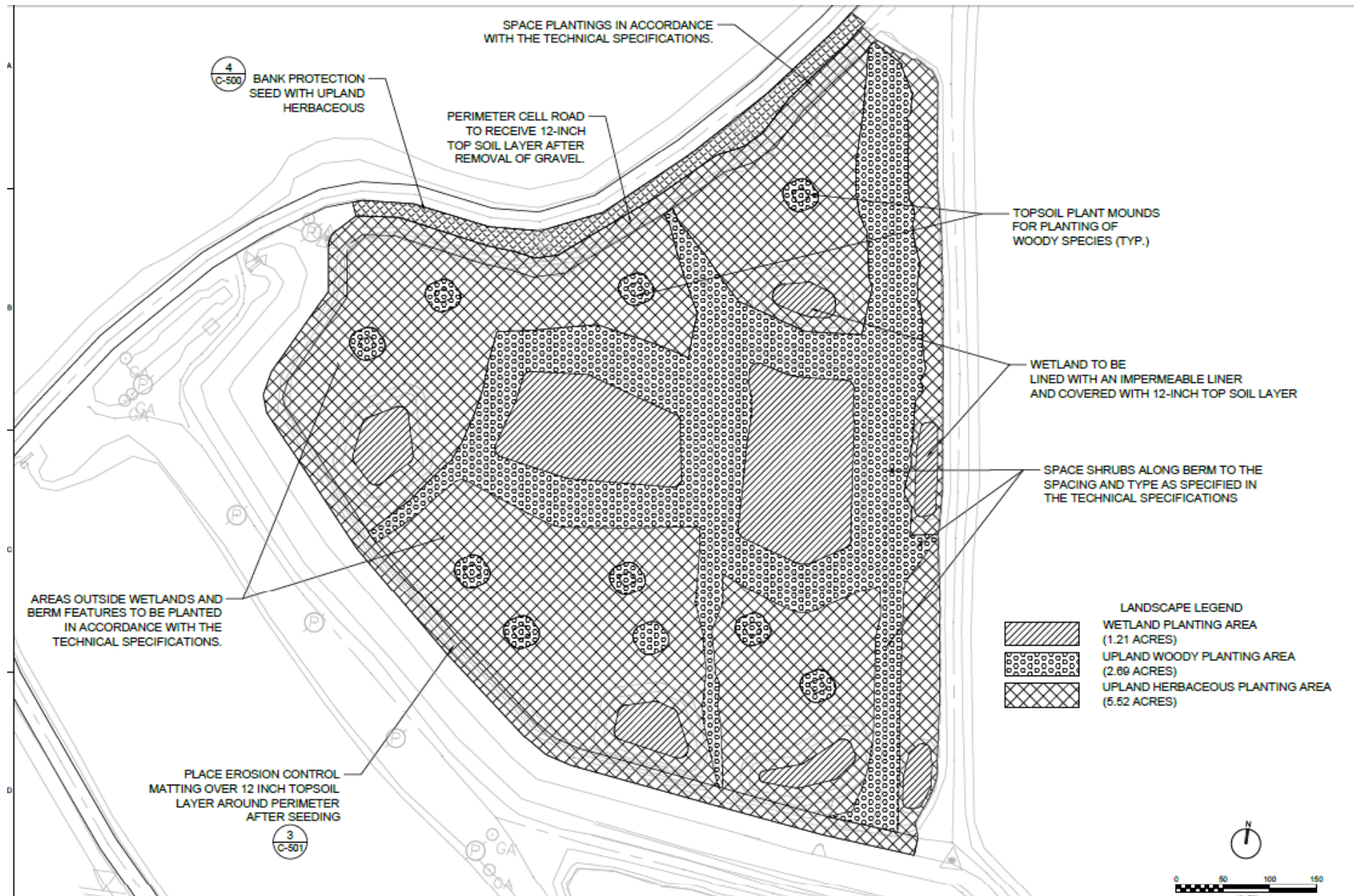


# Vegetative Cover Design Elements

- ▶ Incorporates a mixture of upland and wetland areas with native plantings
- ▶ Upland areas consist of:
  - ~ 6-inch sand grading layer/capillary barrier
  - ~ 12 inch median topsoil cover (could range from 6-inches to several feet thick to support plant diversity)
  - Vegetation consisted of upland, native prairie species, shrubs and trees
- ▶ Wetland areas
  - Eight small perennial wetlands totaling 1.21 acres
  - PVC liner with 12-inch topsoil layer
  - Vegetation consisted of native wetland species



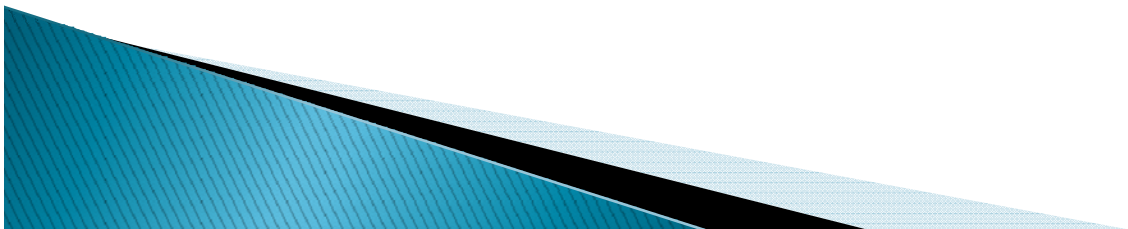
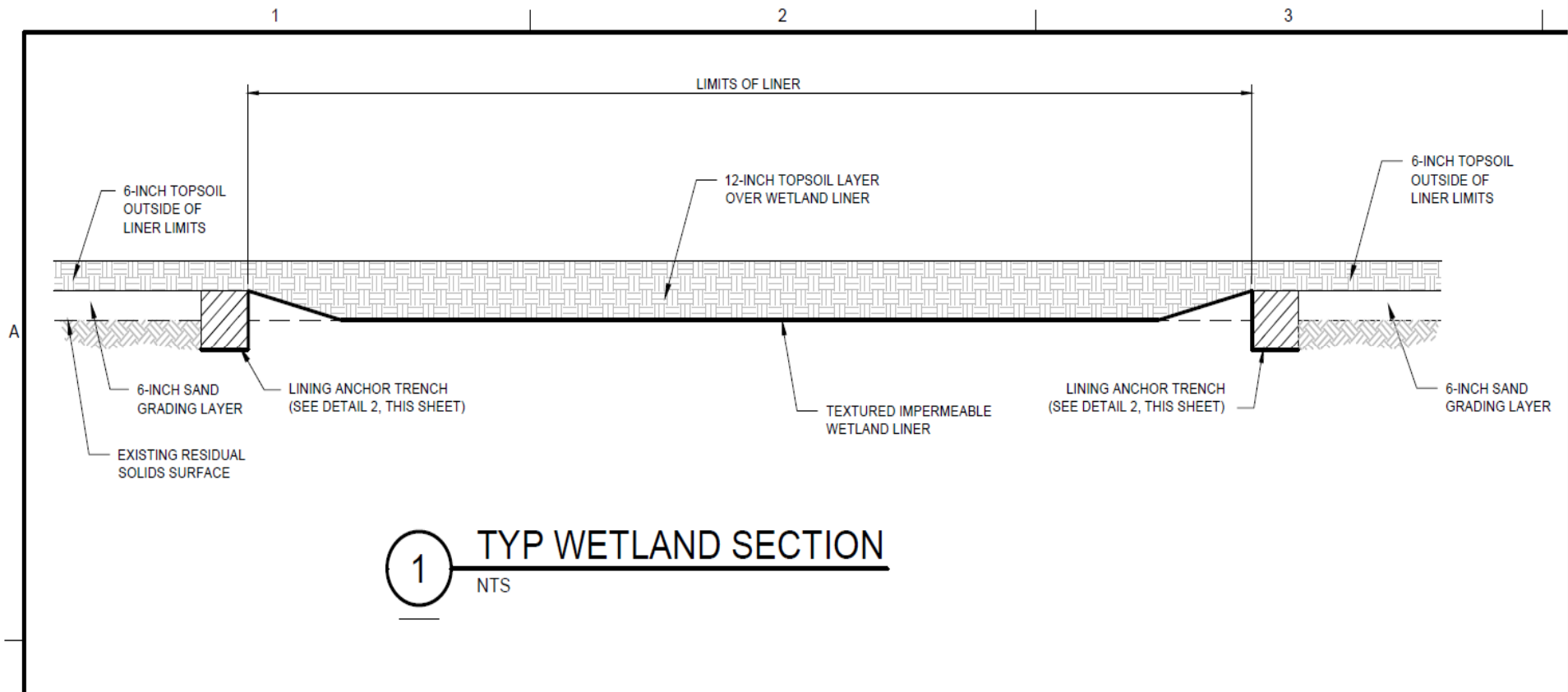




## West Cell Final Configuration



# Typical Cover Cross Section Showing Materials





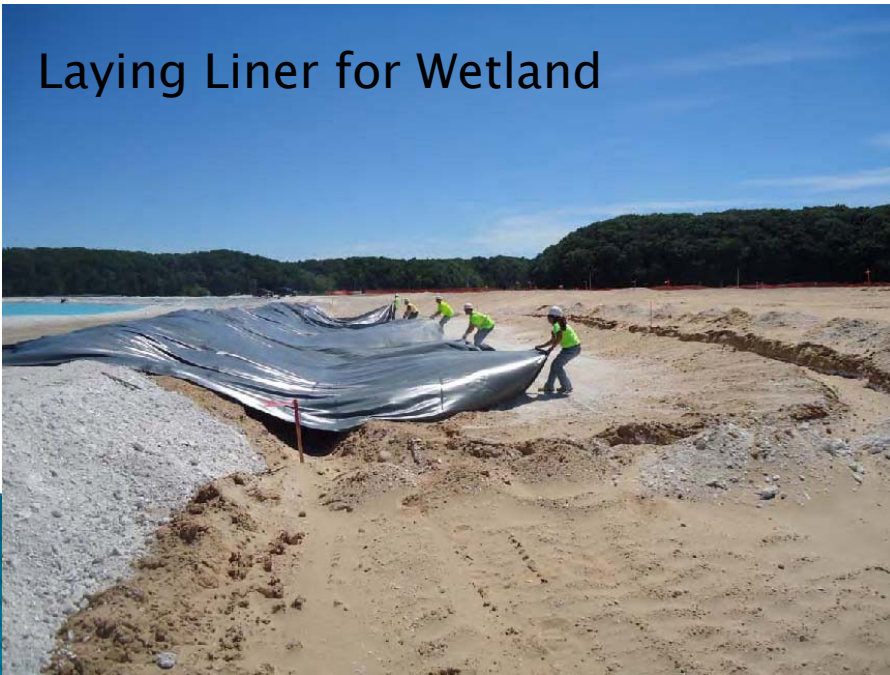
Grading Residual Solids



Placing Sand Layer



Laying Liner for Wetland



Placing Topsoil





Before



### West Cell Cover

- Before showing lime solids
- After showing initial fall planting

After

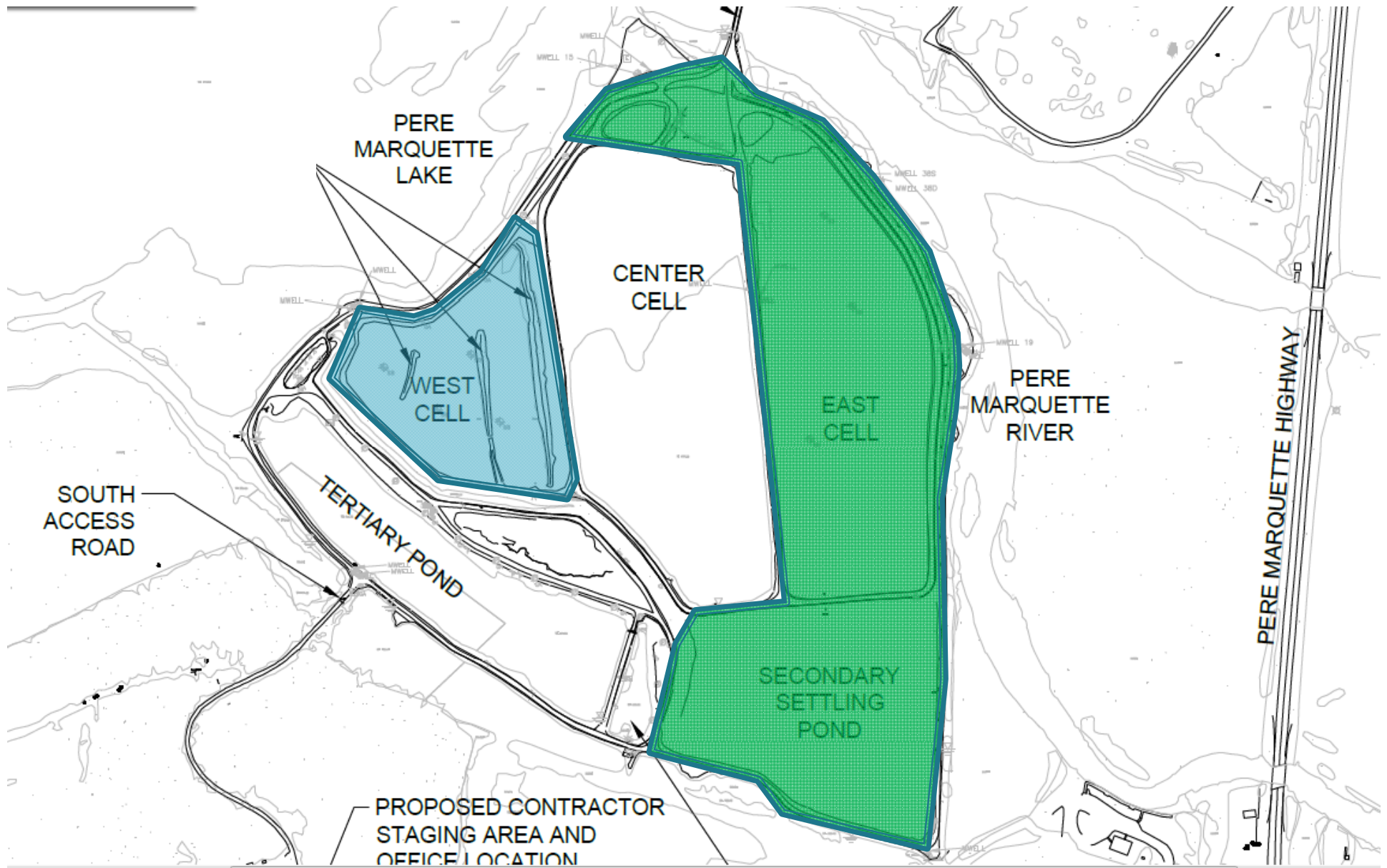




# East and Secondary Cell Planned Construction







## East and Secondary Cell Project Area



# East and Secondary Cell Cover Construction Project

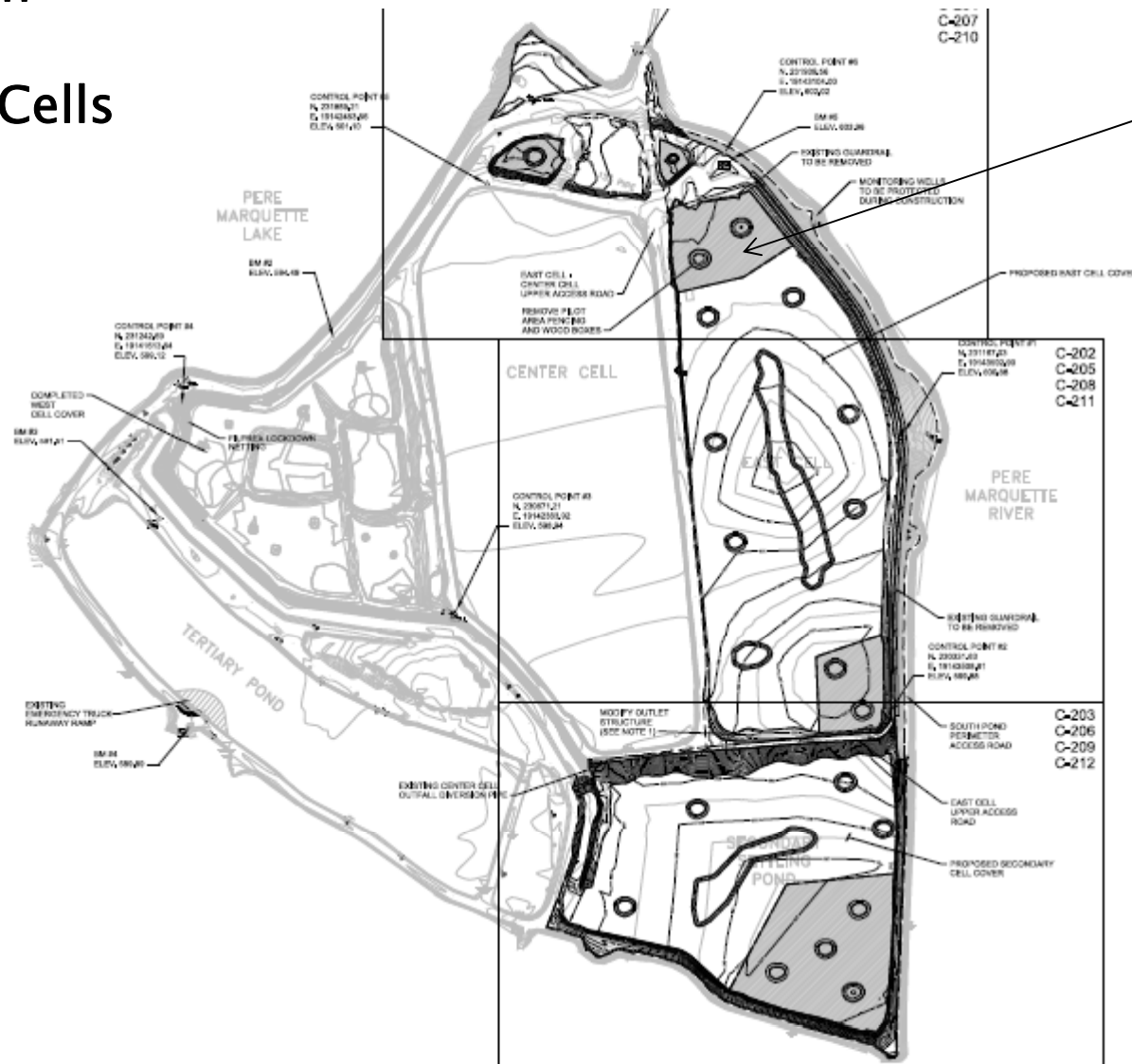
- ▶ Similar design to West Cell (sand barrier layer, topsoil, lined wetlands)
- ▶ Area to be covered approximately 33 acres in size
- ▶ Incorporate larger wetland areas into design due to larger acreage available
- ▶ Include improvements to perimeter dikes and unused lands on north end of South Pond complex.

## Goals:

- Improve aesthetic from Pere Marquette Highway and surrounding areas
- Facilitate possible multi-purpose non-motorized trail



# Final Design East and Secondary Cells

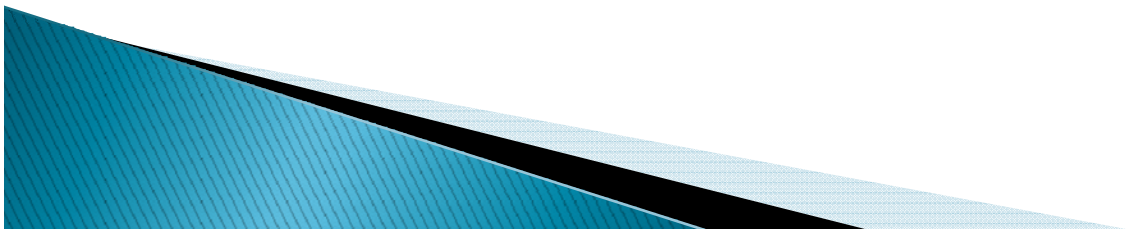


## Wetland Areas



# East and Secondary Cell Schedule

- ▶ Initiate regulatory closure process of inactive portions of South Pond
- ▶ Spring 2014 initial earthwork
- ▶ Fall 2014 complete all earthwork and initial vegetation plantings
- ▶ Spring 2015 final plantings
- ▶ Fall 2014 – Fall 2015 ongoing monitoring and maintenance of the vegetative cover





# Discussion of Closure Process

- ▶ Consistent with MDEQ Solid Waste Policy and Procedures Memo 115-25
  - Residual solids exceeds inert criteria
    - Designated as “site and source-separated materials” as provided in Rule 119 (R299.4119) of the Part 115 Rules
  - Received water before October 7, 1993
  - Known groundwater impacts
- ▶ Will seek closure in accordance with Part 201
- ▶ Install clean covers on inactive portions
- ▶ Proceed with Interim Response Activity Plan



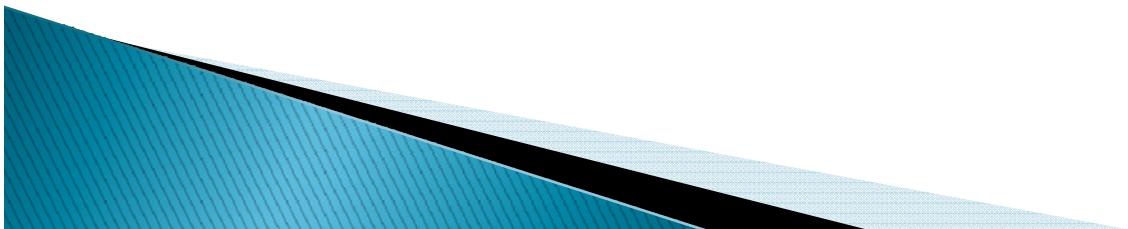
# Environmental Conditions of Property to be Transferred





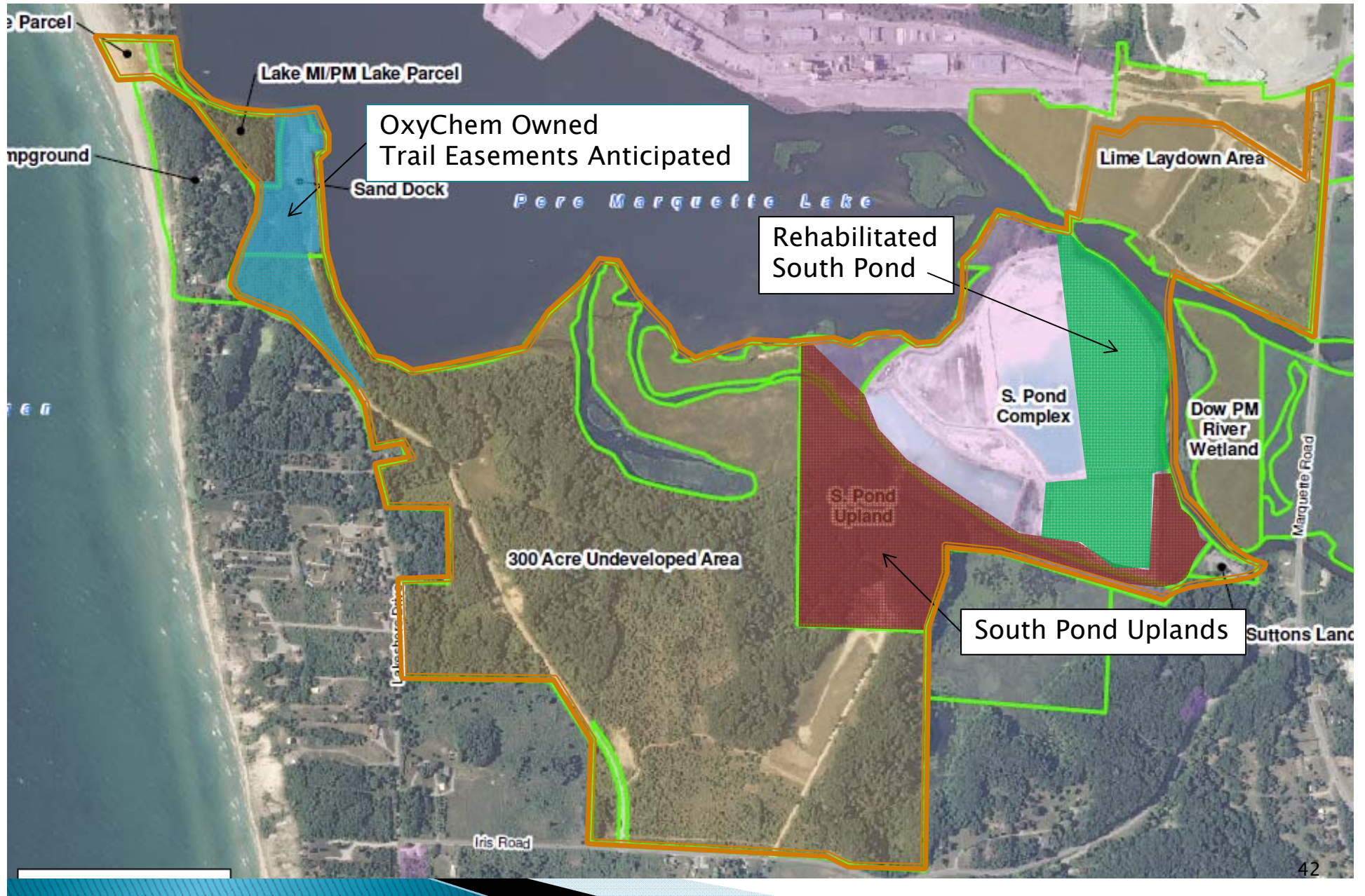
# Land Potentially in Public Ownership

- ▶ **Former Lime Lay Down Area (~49 acres)**
  - Dow owned. Features: currently undeveloped; fill materials placed over historic wetland; former oil storage tank; former equipment storage
- ▶ **South Pond Uplands Area (~45 acres)**
  - Currently OxyChem owned. Features: currently undeveloped; brine return well; former landfill; perimeter dikes from South Pond complex
- ▶ **Undeveloped Area (~278–acres)**
  - Dow owned. Features: currently undeveloped; former employee park; sand borrow pit; pipeline easement; no industrial activity
- ▶ **Rehabilitated South Pond (~30 acres)**
  - Currently OxyChem owned. Features: out of service ponds
- ▶ **Lake Michigan & PM Lake beach parcel (~9 acres)**
  - Dow owned. Features: public access to Lake Michigan beach





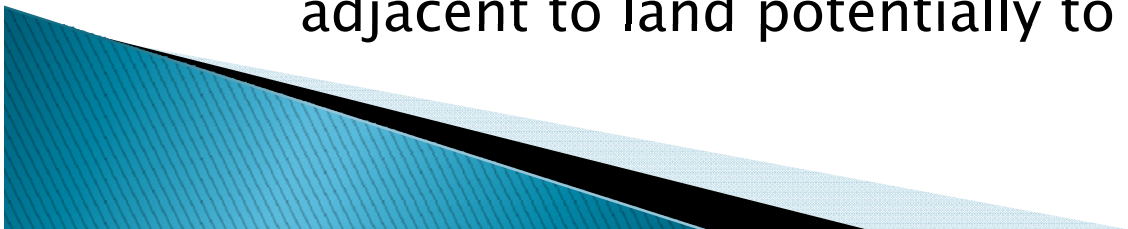
# Project Area – Properties





# Former Lime Lay Down Area

- ▶ Environmental Assessment Phase I Findings
  - Groundwater: Impacted by chloride and TDS
  - Soil: Historic wetland filled with various materials such as lime solids, ash, refractory brick, etc.
  - Surface Water: Evidence of discolored soil at seasonal seeps
  - Historic Operational Areas
    - Lime solids drying area (currently covered by soil)
    - Former Oil Storage Tank (demolished)
    - Former “Bone Yard”
    - Former Gas Plant (demolished) – located on property adjacent to land potentially to be in public ownership





# Former Lime Lay Down Area

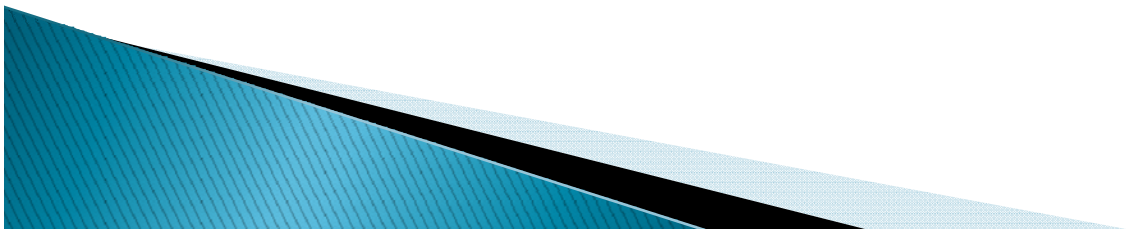
- ▶ Environmental Assessment Phase II Findings
  - Former Oil Storage Tank: No evidence of any impacts to soil or groundwater
  - Former Bone Yard: No evidence of any impacts
  - Former Gas Plant: PCE impacts in soil (Gas Plant is not on property that is part of conservation project)
  - Surface Soil: Arsenic in surface soil requires additional evaluation
  - Surface Water: Seeps dry
- ▶ 2014 Planned Additional Sampling (Phase III)
  - Surface samples across fill area
  - Seep samples
  - Soil and groundwater near former Gas Plant





# Former Lime Lay Down Area

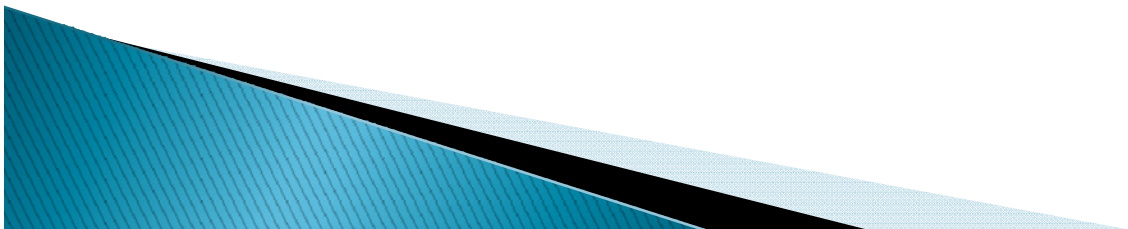
- ▶ Desired end use:
  - Public boat launch and multiuse non-motorized pathway connecting Ludington to Buttersville Peninsula and Lake Michigan
- ▶ Anticipated Path Forward
  - Complete assessment of soil conditions
    - If necessary, place additional fill materials over impacted areas
  - Place deed restrictions on property: recreational use only, prohibit groundwater use, and prohibit excavation and soil movement





# South Pond Uplands Area

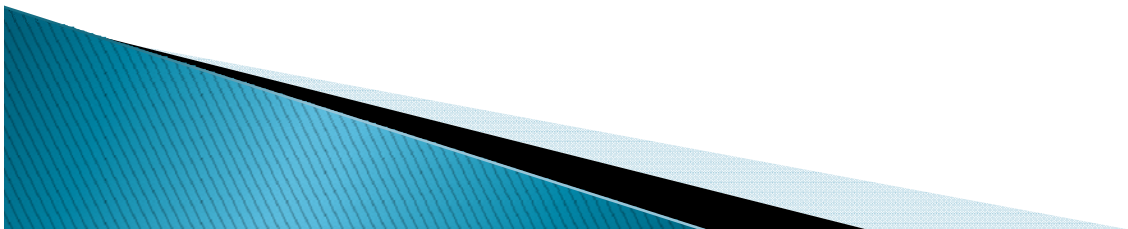
- ▶ Environmental Assessment Findings Phase I
  - Groundwater: Impacted by chloride and TDS
  - Soil: Fill materials used in dikes for South Pond complex.
  - Historic Operational Areas
    - Former Section 26 Landfill: Reportedly an area of solid non-hazardous waste disposal. Records suggest materials may have been removed.





# South Pond Uplands Area

- ▶ Environmental Assessment Phase II Findings
  - Section 26 Landfill: Geophysical surveys indentified location of landfill – less than ½ acre in size.
- ▶ 2014 Planned Additional Sampling (Phase III)
  - Collect groundwater samples adjacent to landfill and surface water from any seeps that may be present proximal to landfill.





# South Pond Uplands Area

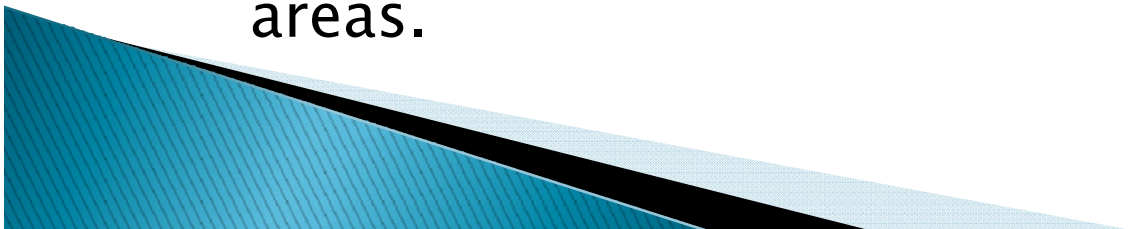
- ▶ Desired end use:
  - Conservation area; multiuse non-motorized pathway connecting Ludington to Buttersville Peninsula and Lake Michigan; and hiking trail system
- ▶ Anticipated Path Forward
  - Complete assessment of former landfill and potential impacts to groundwater/surface water
    - If necessary, place additional cover materials over landfill
  - Place deed restrictions on property: recreational use only, prohibit groundwater use, and prohibit excavation of former landfill





# Undeveloped Area

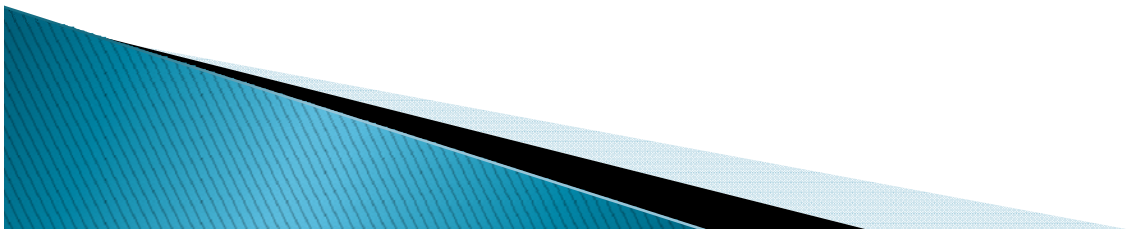
- ▶ Desired end use:
  - Conservation area; multiuse non-motorized pathway connecting Ludington to Buttersville Peninsula and Lake Michigan; day use area, and hiking trail system
- ▶ Anticipated Path Forward
  - No further environmental evaluation. Only known environmental condition is chloride in groundwater on portions of property.
  - Place deed restrictions on property: recreational use only and prohibit groundwater use in affected areas.





# South Pond Rehabilitated Area

- ▶ Desired end use:
  - Conservation area; multiuse non-motorized pathway connecting Ludington to Buttersville Peninsula and Lake Michigan
- ▶ Anticipated Path Forward
  - Construct vegetative cover. Environmental conditions will be buried lime solids and chloride/TDS impacted groundwater.
  - Place deed restrictions on property: recreational use only and prohibit groundwater use





# Path Forward

- ▶ Cover East and Secondary Cells (Q2–Q3 2014)
- ▶ Pursue regulatory closure of inactive portions of South Pond
- ▶ Work with PMCT and LCWM on MNRTF grant application (Q2–end of the year 2014)
- ▶ Coordinate property easements and land ownership adjustments (ongoing)
- ▶ Complete follow-up site investigations to address data gaps (Q2–Q3 2014)
- ▶ Complete environmental assessment reports for MDEQ endorsement (Q3–Q4 2014)





# Action Items/Discussions

